THE VALIDITY OF LABOUR ADMISSION TEST AS SCREENING TEST IN PREDICTING FETAL OUTCOME

Dissertation submitted for
MD Branch II
Obstetrics and Gynaecology

THE TAMILNADU M.G.R. MEDICAL UNIVERSITY
CHENNAI
MARCH 2009

CERTIFICATE

This is to certify that this dissertation entitled **"THE VALIDITY OF LABOUR ADMISSION TEST AS SCREENING TEST IN PREDICTING FETAL OUTCOME"** is a bonafide original work of **Dr. P.NITHYA** Post Graduate Student (2006-2009) in the department of Obstetrics and Gynaecology, Stanley Medical College, Chennai in partial fulfilment of the regulations laid down by the Tamil Nadu Dr.M.G.R.Medical University, Chennai for M.D. (Branch II) Obstetrics and Gynaecology examination held in March 2009.

Dr. J.MOHANASUNDHARAM
M.D., D.N.B., Ph.D.
Dean
Stanley Medical College,
Chennai – 600 001.

Prof. M.MOHANAMBAL,
M.D., D.G.O.,
Superintendent,
Department of Obstetrics and Gynaecology,
Govt. RSRM Lying in Hospital,
Govt. Stanley Medical College,
Chennai – 600 013.

Decisions are easy when values are clear

– Ray Disney

ACKNOWLEDGEMENT

I sincerely thank **Prof. Dr.A.MOHANASUNDARAM, M.D. (Pharmacology), Dip. N.B, Ph.D** respected Dean of our Government Stanley Medical College and Hospital for giving me permission to do this project.

I am greatly indepted to **Prof.Dr.MOHANAMBAL, M.D., DGO.,** Superintendent of Government RSRM Hospital, Chennai, for allowing me to do this project in our institution and her valuable guidance.

I am greatly thankful to **Prof.Dr.AMRITHA PRISCILLA NALINI, M.D., DGO.,** Deputy superintendent of Government RSRM Hospital, Chennai, for her valuable guidance.

I am also thankful to **Prof.Dr.SASIREKHA, M.D., DGO.,** Additional professor Government RSRM Hospital, for her valuable guidance.

I extend my heartful thanks to **Prof.Dr.ANURADHA, M.D., DGO.,** Additional professor Government RSRM Hospital, for her support and guidance throughout the project.

I extend sincere thanks to **Prof.Dr.RAJINI, M.D., DGO.,** Additional professor Government RSRM Hospital, for her support and guidance.

I am also greatly thankful to **Dr.HEPHZIBHAH KIRUBHAMANI,MD DGO, Ph D,** respected RMO of Government RSRM Hospital, for her valuable guidance and provision of necessary facilities to carry out this study.

I wish to thank all unit Chiefs & Assistants and all my colleagues for their support.

At last, I thank all the patients for their kind co-operation.

CONTENTS

THE VALIDITY OF LABOUR ADMISSION TEST (LAT)-AS A SCREENING LIST IN PREDICTING FETAL OUTCOME

INTRODUCTION

"One of the worst outcomes of pregnancy is the delivery of an asphyxiated newborn. An asphyxiated newborn has no spontaneous respiration, is bradycardic, has poor or no muscle tone, does not cry and requires immediate resuscitation to avoid death. Many of these newborns will have a complicated course in the neonatal intensive care unit and will require mechanical ventilation and treatment of multiple organ failure. The majority of them will recover without apparent deficits but some will develop neurological sequelae".

This dreadful clinical picture is the result of an abnormality in the total gas exchange resulting in severe hypoxia and acidosis, which has multiple causes that can be divided into three groups.

1. Chronic fetal conditions.

2. Acute complications during Labour and delivery.

3. Neonatal problems.

In an effort to avoid this outcome, a larger part of the current obstetric practice consists of methods to detect, avoid and treat fetal asphyxia.

In the last few decades, technological advances have undoubtedly contributed significantly to improved maternal and perinatal outcome. The impact on assessment of the fetus in utero has been particularly striking. It is now possible to assess the fetus not only for structural malformations, but also for its physiological states and well being. It is estimated thtoat 20-40% stillbirths in the non anomalous category occur as result of intrauterine hypoxia and are therefore potentiality preventable.

In this context, a screening test is ideally needed at the time of on -set of labour which can detect the already existing compromise on the fetus and which can also predict its well-being for next hours in labour, so that timely intervention can prevent irreversible neurological damage and death.

"Giving a live healthy baby to the healthy mother with emotional satisfaction of the mother and her family is the prime goal of the obstetrician and the state".

Assessment at the admission to labour ward helps us to look carefully for high risk factors previously undetected and new factors that have sinceto appeared.

Two problems have be solved during assessment. Firstly, even after vigorous selection based on known antenatal risk classification system, fetal morbidity and mortality tend to occur in the so-called low risk groups (Hobel et al 1973). This leaves us with the task of determining who is at low risk. A new system must be developed to identify those who are at risk in labour by means of the "Admission test". Second problem we face is the difficulty in providing one to one care to offer optimal standards of intermittent auscultation with inadequate trained man power. For good results with auscultation one has to listen to fetal heart rate for one minute very 15 minutes perfectly after a contraction in the first stage of labour and after each and every other contraction during the second stage of labour. This may not be feasible in many centers.

Routine electronic fetal monitoring in labour has become an established practice in the labour wards. In labour wards with few monitors, an admission CTG is a very useful tool which gives an early, easy and quick assessment of fetal well being, at the same time doing away with continuous electronic fetal monitoring.

- w Admission test is a 'Natural contraction stress test that can assess the ability of fetus to withstand the functional stress of uterine contractions and helps to identify those cases at risk.

- s It is a 20 minute recording of FHR and uterine contractions using a CTG machine at the time of admission to labour ward, so it is very simple, can be done rapidly with high patient acceptability.

AIM OF THE STUDY

To find out the validity of admission test in predicting fetal distress and evaluation of admission test as a screening test to detect fetal hypoxia already present at the time of admission and to predict adverse outcome.

REVIEW OF LITERATURE

The history of fetal heart rate monitoring starts from 1960s, Mareac, a French physician was ridiculed in a poem by a colleague, Phillipe De Goust claming to hear the heart of the fetus "beating like the clapper of a mill"

a **Laennac,** a physician working in Paris (1806), was the father of techniques of auscultation of heart and lungs.

a **Le Jumean,** also a physician working with Laennac became interested in applying this technique to other conditions including pregnancy.

i It was not till 1818 that Francosis Isac Mayor at Geneva, a surgeon reported that the feral heart was audibly different from the maternal pulse by applying the ear directly to the pregnant mother's abdomen.

f **John Creesy Ferguso** later to become the first professor of Medicine in 1827 was the first person in Britain to describe the fetal heart sounds who subsequently published his famous work entitled observation on obstetric auscultation in 1833,

1 **Auron Fridrish Holit** was the first to design the fetal stethoscope in 1834, **Bepaul** modified this although **Pinards** name is most commonly associated with the stethoscope, his version followed several others only appearing in 1876.

n **Ninkel** in 1893 empirically set the limits of normal heart rate as 120-160 bpm.

i 1953, **Gunn and Wood** reported the application and recording of fetal heart sounds in the proceeding of the Royal Society of Medicine.

S In 1958, Hon pioneered electronic fetal monitoring in USA **Caldeyro Barcia** in Uruguay and Hanaction in germany reported their observation on the various heart rate pattern associated with fetal distress.

r The production of the first commercially available fetal monitor by Hammaclier and Howlett Packard in 1968 was soon followed by Sonicard in the U.S.A.

f **Caldeyro Barcia** and co workers (in 1966) description is also widely known. Their type I dips correspond to those early uniform or variable deceleration or a combination of both and their type II dips correspond to Hons late uniform decelerations.

Kubli et al 1969, graded variable decelerations according to amplitude and duration as mild, moderate and pronounced. Fetal Scalp Blood pH correlated with this classification such that the mean pH with mild deceleration was 7.2, with moderate deceleration was 7.15.

m In 1968, the first clinical electronic fetal monitor became available and Paul et al 1975 reported that such monitoring reduced both caesarean section for fetal distress and perinatal asphyxia.

r **Trimbas and Kaure** 1978 performed 594 cardiotocograph records in all normal pregnancies between 34-40 weeks of gestation and found no ominous pattern, 7.2 were suspicious and atleast one such record was seen in 37% of all pregnancies. These result indicate the potential danger of false positive results in normal pregnancies if the method is not used appropriately.

n **Solium** and Coworkers 1979-1980 suggested classification into four groups was slightly modified by montan et al 1985. In practice 85-90% of all antepartum cardiotocograph record are normal 6-8% are suspicious and 1-2% pathological.

p Krebe et al 1979 found frequency of low APGAR scores to be high 69.6%, in the first 30 minutes of labour when cardiotocograph was abnormal, compared with records that were normal 2.7%, suspicious 15.8%.

c In the Dublin fetal heart rate monitoring study **Mac Donald** et al 1985 compared continuous fetal monitoring with intermittent auscultation. The neonatal seizure was significantly high in the auscultation group (8.5%). Compared with the electronically monitored group (20%)

t 1985, at **Kandang – Kerbau** Hospital in Singapore- an admission test study was carried out on 1041 low risk patients. The trace was obtained for 20 minutes immediately on admission and it was sealed in an envelope and put aside for later analysis. In this study woman with ominous tracing 40% developed fetal distress and in women with reactive tracing 1.5% developed fetal distress.

t Electronic fetal monitoring has been a subject of controversy for the last two decades. Several authors criticize for the policy of electronic fetal monitoring (Leveno et al 1986, shy et al 1990). claiming that it led to increase in caesarean section with no evidence of fetal benefits.

s A new test is required to pick up the apparently low risk women whose fetus is compromised on admission or likely to become compromised in labour. This is the admission test (**Arulkumaran** et al and GIBB 1992).

Arulkumaran with GIBB 1992, bearing the acute events the admission test may be good predictor of fetal condition at the time of admission and during the next few hours of labour in term fetuses labelled as low risk. It was estimated that in these situation for 50% of babies to become acidotic took 115 minutes with repeated variable deceleration and 185 minutes with a flat Trace. therefore it can be safely assumed that if the admission test was reactive, it is reasonable to perform intermittent auscultation and 20 minutes of electronic fetal monitoring 2-3 hourly in low risk labour. High risk women (or) women with suspicious or abnormal AT, should have continuous EFM throughout labour.

w **Ingemarsson et al 1993 –** In low risk pregnancies fetal heart changes were found in 5-10% of antenatal records. A normal cardioticograph record occur only in 50% of all labour. About 15% of all records have a baseline abnormality with normal baseline ranging from 110-150 bpm, 10% will have tachycardia, while frequency of bradycardia is less than 10%.

t **Ingemarsson et al** 1993- the presence of acceleration is one key to reactive pattern on an antepartum CTG. The number of accelerations increase towards the end of the pregnancy with the greater increase occurring between 28 and 34 weeks, Between 25 and 30 weeks of gestation decelerations are more common than accelerations in response to fetal movement. Most of the decelerations are of short duration (15-30 sec) with amplitude of 14-30 bpm. After 30 weeks, accelerations are more common than decelerations in response to fetal movements. At term, decelerations are not seen with fetal activities.

The 'AT' cannot be expected to predict fetal distress that develop several hours later in labour when the fetal condition was satisfactory at the time of admission (Ingemarsson). It has a high predictive value for fetal well being 98.7% and high sensitivity, but rather a predictive rate of an abnormal test (40%) and a low specificity (23.5%).

h **Vintzileo** et al, 1995 compared continuous EFM versus intermittent auscultation and found EFM is superior with better sensitivity, low specificity, high negative and positive predictive values.

s **Kamal Bak Shee et al (1999)** conducted a study with AT for 100 patients with 68% in low risk and 32% in high risk groups. In their study they had 85% AT with reactive pattern and 4% of AT were of ominous pattern. There were higher incidence of caesarean section , FHR deceleration (50% Vs 20%) Low APGAR at 1 minute (25% Vs 3.5%) and NICU admission (100% Vs 7%) in patients with ominous AT compared with reactive AT. The sensitivity if AT in predicting fetal distress was 21.43% and specificity was 87.5% and PPV 40% NPV 75.14%.

FETAL PHYSIOLOGY AND CONTROL OF FETAL HEART

There is an important difference between adult and fetus in the relationship of cardiac output, fetal heart rate and stroke volume. In the adult, an increase in cardiac output can be achieved by increasing both heart rate and stroke volume. An increase in the stroke volume occurs in adult by Frank – starling's law. The amount of blood pumped out by the heart depends upon the amount of blood entering into the heart, pumping power that is elasticity and maximum stretch ability of the heart. But in the fetus, the stable stroke volume cannot be increased and the cardiac output is mainly dependant on the heart rate.

In the fetus, cardiac output and the O_2 supply to the brain are mainly heart rate dependant.

CONTROL OF FETAL HEART RATE

It is a complex phenomenon. The fetal heart has its own intrinsic activity and a rate determined by the spontaneous activity of pacemaker. That is the sinoatrial node. This structure has the fastest rate and determines the rate of the normal heart. The next fastest pacemaker is in the atrium. AV node has the lowest rate of activity and generates the type IV rhythm seen in complete heart block.

The FHR is modulated by a number of stimuli. CNS influence is important with cortical and subcortical influences, which is not under voluntary control. Other physiological factors regulate the heart rate such as circulatory catecholamines, chemoreceptors, baroreceptors, their interplay with the autonomic nervous system.

BARORECEPTORS

They are stretch receptors that are sensitive to changes in blood pressure and are situated in the arch of aorta and aortic and carotid sinus. In response to a rise in blood pressure, impulses from the baroreceptors are sent to caridoregulatory centre, resulting in an increase in vagal stiumulation. Thus HR is slowed down in an attempt to restore the blood pressure to a normal level.

CHEMORECEPTRS

They are situated in the carotid and aortic bodies in a similar position to that of baroreceptors and also in the midbrain itself. The chemoreceptors respond to changes in O_2 and CO_2 tension. A fall in O_2 in blood detected by the carotid

and aortic bodies would result in an increased sympathetic discharges from the cardio regulatory centre. This causes an increase in FHR and thus blood pressure. If the fall in PO_2 was severe then diversion to the vital organs, the brain and the heart would also result.

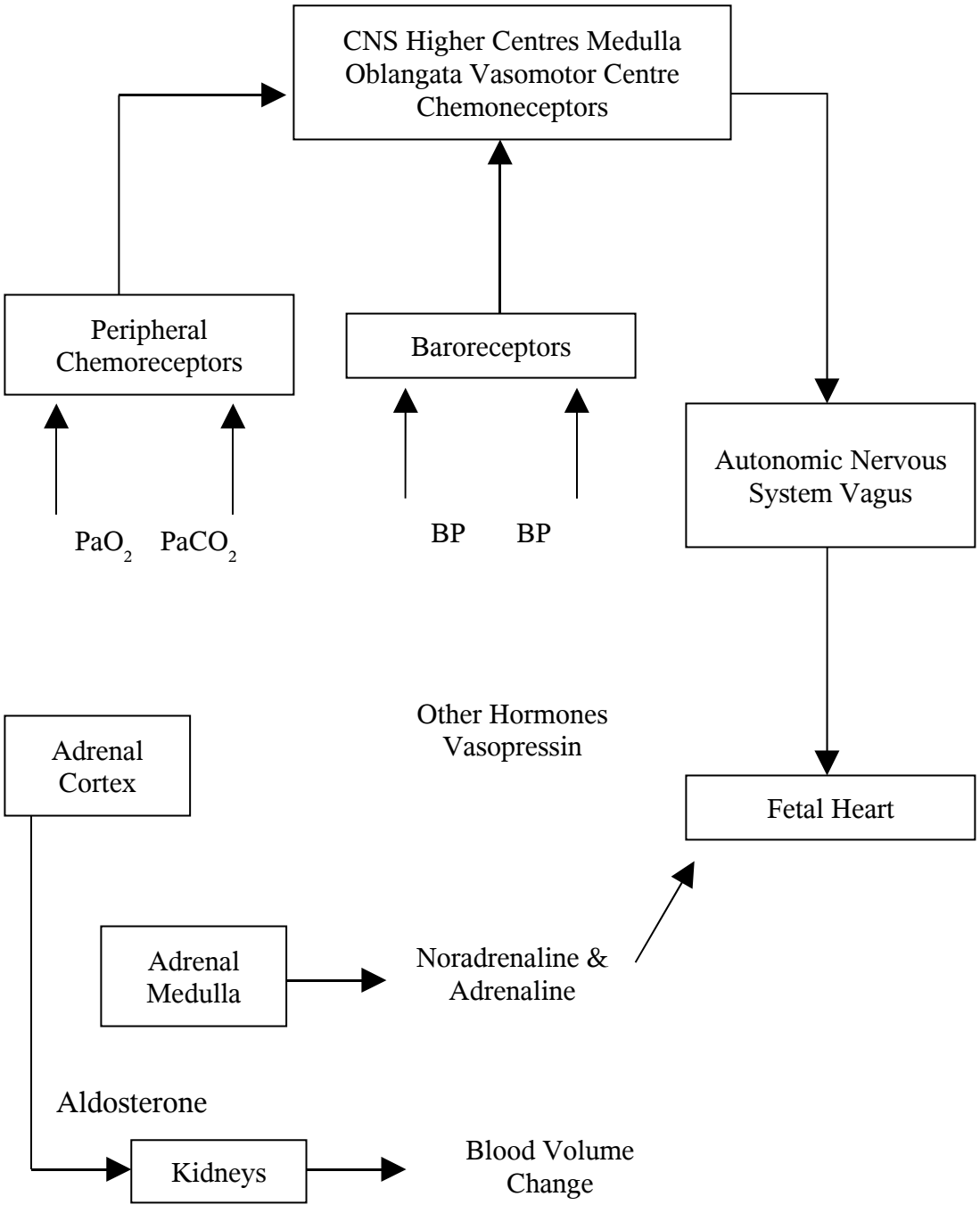
ADRENAL MEDULLARY RESPONSE

In response to stress, adrenal medulla releases the hormones, noradrenaline, adrenaline which results in increase in fetal heart rate and force of cardiac contraction in a manner similar to sympathetic nervous system.

HIGHER CENTERS IN BRAIN

They are responsible for the so called rest activity cycle. During the fetal rest cycle, the fetus is apparently sleeping in uterus with reduced fetal body and limb movements and in CTG, there is absence of acceleration and reduced baseline variability. A fetal rest cycle normally lasts for about 20 min following which there is return to normal fetal movement and fetal heart rate variability.

CONTROL OF FETAL HEART RATE



FETAL COMPENSATORY SYSTEM IN RESPONSE TO HYPOXIA

In response to hypoxia

i) Stimulation of sympathetic nervous system and increased adrenal medullary activity result in an increased heart rate in an attempt to increase the cardiac output and redistribution of blood flow to vital organs.

ii) There is an increase in breakdown of liver glycogen to supply energy to the fetus. As a result of this anaerobic metabolism there is an accumulation of lactate to produce a metabolic acidosis. Although initially the acidosis is compensated by fetal buffering system especially Hb, this will eventually be overcome and the acidosis will become more severe. When the pH drops below 7.0 enzyme systems are inhibited and if this is maintained for a long time death will occur ultimately.

Length of lime that a fetus can with stand the hypoxia is related to its glycogen reservoir. This means that a growth retarded fetus with low glycogen stores will be more susceptible to intrauterine hypoxia.

FACTORS THAT COMMONLY CAUSE HYPOXAEMIA:

1. Reduction in uterine blood flow

    a) Uterine contraction, uterine hyperstimulation with oxytocin, in association with abruption placenta

    b) Fall in maternal blood pressure (eg) Supine hypotension syndrome, hypovolemic shock, epidural analgesia.

    c) Placental insufficiency-secondary to hypertension.

2. Reduction in umbilical blood flow-due to compression of the cord.

TRACING CHARACTER SEQUENCE & DEGREE OF HYPOXIA

(Arulkumaran 1992)

Normal Trace

↓

Early Hypoxia – Disappearance of acceleration with fetal

↓ movements

Further hypoxia – Disappearance of acceleration with contraction

↓

Further hypoxia – Rising base line FHR

↓

Further hypoxia – Reduction is baseline variability to less than 5bpm

↓

Further hypoxia – late deceleration with contractions

ELECTRONIC FETAL MONITORING – FUNDAMENTALS

HOW THE CTG MACHINE WORKS?

The fetal heart rate is detected through the maternal abdominal wall using the Ultrasound doppler principle. Ultrasonic waves undergo a shift in frequency as they are reflected from moving heart valves and from pulsatile blood ejected during systole. The signals are edited electronically before FHR data are printed into the bedside monitor tracing paper.

RECOMMENDATION FOR SCALING PAPER

(CHHDRP Workshop 1997)

30 bpm per vertical cm and

3cm/min chart recorder paper speed.

FOUR CARDINAL FEATURES OF FHR TRACE:

1. Baseline heart rate
2. Baseline variability

3. Accelerations
4. Decelerations

BASELINE HEART RATE

Normal Baseline heart rate of fetus is below 110-160 bpm.

It is identified by drawing a line through the mid point of the waviness which represents the most common rate after excluding accelerations and decelerations. The average fetal heart rate is considered to be the result of tonic balance between accelerator (sympathetic) and decelerator (parasympathetic) influences on the pacemaker cell.

BRADY CARDIA

If the baseline heart rate is below 110bpm, it is termed as bradycardia.

Moderate bradycardia 100-110bpm

Severe bradycardia <100 bpm

Pragmatically, a rate between 100-119 bpm in the absence of other changes, usually is not considered to represent fetal compromise, may be due to head compression in second stage. Freeman and colleagues (2003) – Bradycardia in the range of 80-120 bpm with good variability is reassuring. Rates less than 80 bpm are generally considered non reassuring.

SOME CAUSES FOR BRADYCARDIA :

1. Head compression in case of occipito posterior (or) occipito transverse position.
2. Congenital heart block
3. Serious fetal compromise like in acute abruption
4. Under GA
5. Sustained bradycardia can occur in the setting of severe pyelonephritis & material

hypothermia.

TACHYCARDIA

Is defined as a baseline heart rate in excess of 160 bpm.

The most common explanation for fetal tachycardia is maternal fever from amnionitis, although fever from any source can increase baseline heart rate.

Other causes : Fetal compromise
Cardiac arrhythmias
Maternal administration of
parasympathetic (atropine)
Sympathomimmetic drugs (terbutaline)

The key feature to distinguish fetal compromise in association with tachycardia seems to be concomitant heart rate decelerations. Prompt relief of the compromising event, such as correction of maternal hypotension caused by epidural analgesia, can result in fetal recovery.

"Wandering baseline" – This baseline is unsteady and "wanders" between 120-160 bpm. This rare finding is suggestive of a neurologically abnormal fetus and may occur as a preterminal event

BASELINE VARIABILITY

The sympathetic and parasympathetic "push-pull" mediated via the sinoatrial node, produces moment to moment or beat to beat oscillation of the baseline. This is defined as baseline variability.

- Short term variability reflect the instantaneous change in the fetal heart rate from one beat to the next. It is the measure of the time interval between each cardiac systoles.
- Long term variability reflect the oscillatory change that occur during the course of one minute and result in waviness of the baseline. Normal frequency 3-5 cycles per minute.

MEASUREMENT OF BASELINE VARIABILITY

It detected by assessing the band width of the waviness by drawing a line through the highest and lowest point in the waviness in any one cm segment of the trace, preferably when the trace is reactive (or) showing accelerations.

Normal is 5-25

Reduced <5

PHYSIOLOGICAL CAUSES FOR INCREASED BLV

Fetal breathing

Fetal body movements

Advancing gestation (upto 30 weeks BLV is similar for both sleep and activity and after 30 weeks, it is increased with activity).

CAUSES FOR DECREASED BASELINE VARIABILITY

1) Sleep in quiet phase of FHR cycle
2) Hypoxia
3) Fetal acidemia
4) Prematurity
5) Tachycardia
6) Drugs, analgesics, sedatives, pethidine, phenothiazines, barbiturates, diazepam, anti hypertensives acting on CNS, anaesthetics, MgSo4, Fentanyl.
7) Congenital malformation of CNS & CVS
8) Cardiac arrhythmias
9) Fetal anemia – Rh incompatibility

- It is generally believed that reduced baseline heart rate variability is the single most reliable sign of fetal compromise.

CONTROVERSIES:

- Variability by itself cannot be used as a predictor of fetal well being (Samueloff 1994)
- The development of decreased variability in the absence of deceleration is unlikely to be due to fetal hypoxia (Davidson & Coworkers, 1992).
- A persistently flat trace with normal rate without decelerations may reflect a previous insult

to the fetus that has resulted in neurological damage (Freeman 2003)

SINUSOIDAL HEART RATE

S Stable baseline heart rate of 120 to 160 bpm with regular oscillations

S Amplitude of 5-15 bpm

A Long term variability frequency of 2 to 5 cycles per minute

L Fixed or flat short-term variability

F Oscillation of the sinusoidal waveform above or below a baseline

O Absence of accelerations

CAUSES OF TRUE SINUSOIDAL PATTERN

1. Serious fetal anaemia
2. D-isoimmunization
3. Ruptured vasa previa
4. Fetomaternal hemorrhage
5. Twin-to-twin transfusion

MILD PSEUDOSINUSOIDAL PATTERN:

Mepiridine
Epidural analgesia

INTERMEDIATE PSEUDOSINUSOIDAL PATTERN

Fetal Sucking

Umblical cord compression

PERIODIC CHANGES

1) Accelerations
2) Decelerations – Early

Late

Variable

ACCELERATIONS

- ✓ Accelerations are sporadic rise in FHR >15 bpm from the baseline lasting for 15 see or more.
- ✓ Normal reactive tracing should have atleast 2 acceleration in 20 min period.
- ✓ Acceleration almost always confirm that the fetus is not acidotic at that time. It represents intact fetal neurohormonal cardiovascular control mechanism linked to fetal behavioural states.
- ✓ Accelerations most commonly present in antipartum period and in early labour in association with variable decelerations.
- ✓ Intrapartum accelerations are due to
    - Stimulation by uterine contraction
    - Fetal movements
    - Umbilical cord occlusion
    - Fetal stimulation during examination
    - During fetal scalp blood sampling
    - During acoustic stimulation

Absence of fetal heart accelerations during labour is not necessarily an unfavourable sign unless co-incidental with other reassuring changes.

DECELERATIONS

Drop in fetal heart rate by >15 bpm from the baseline lasting > 15 seconds

EARLY DECELERATIONS

- ♣ They are synchronous with uterine contractions with a gradual decline and recovery, the nadir of fall of FHR coincides with the acme of contractions, mirroring the contraction.

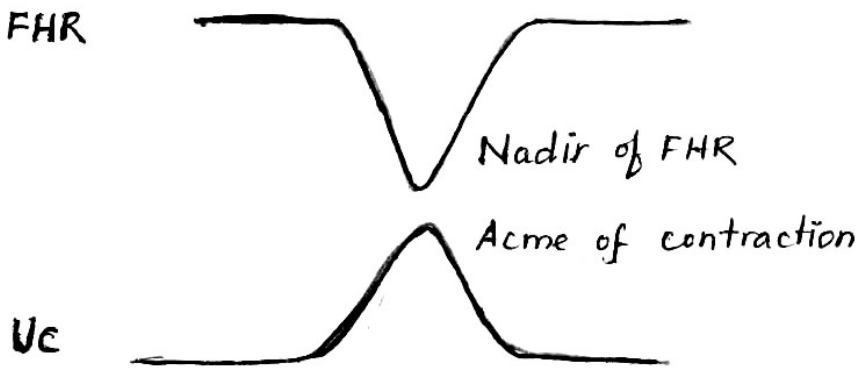
♣ The drop in the FHR in < 40 bpm and it is due to head compression, not due to fetal hypoxia, acidemia or low APGAR scores.

- Head compression - Vagal nerve activation due to dural stimulation

  ↓

  Heart rate decelerations

- Most commonly seen during second stage of labour.



VARIABLE DECELERATION

- They vary in occurrence in relation to contraction and also vary in size & shape. They show a precipitous fall and rise.
- Severe variable decelerations when drop is >60 bpm and lasts for >60 sec. It is due to umbilical cord compression.

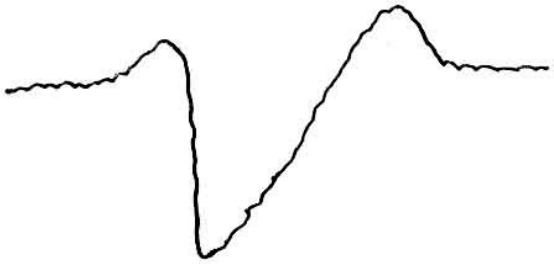
MECHANISM OF VARIABLE DECELERATION

Umbilical vein has a thin wall and lower intraluminal pressure than the arteries. When compression occurs, the blood flow through the umbilical vein is interrupted first before the artery. The fetus therefore loses some of its blood volume this will result in stimulation of autonomic nervous system and result in rise in heart rate to compensate in normal fetus. A small acceleration therefore appears at the start of variable deceleration when the fetus is not compromised. Later umbilical arteries are also occluded and result in rise in systemic pressure in fetal circulation and the baroreceptors are

stimulated resulting in fall in the heart rate. This is responsible for the down ward slope. When both vessels are occluded, deceleration reaches a nadir.

- During release of the cord compression arterial flow is restored first with a subsequent autonomically mediated sharp rise in heart rate. This is responsible for the upward slope.

- Due to systemic hypotension, blood being pumped out culminating in a small acceleration after the deceleration.



- These accelerations before and after the deceleration are called shouldering. They are manifestations of a fetus coping well with cord compression. Normally grown fetuses can tolerate cord compression for a considerable length of time before they become hypoxic. Small growth restricted fetus already compromised can't with stand this and becomes hypoxic.

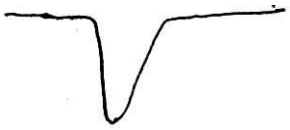
VARIOUS FORMS OF VARIABLE DECELERATIONS AND THEIR SIGNIFICANCE

1) Normal shouldering – Reassures

2) Exaggeration of shouldering- pre pathological

3) Loss of shouldering - pathological

4) Smoothening of baseline variability with the deceleration which is associated with loss of variability at the baseline and therefore pathological.



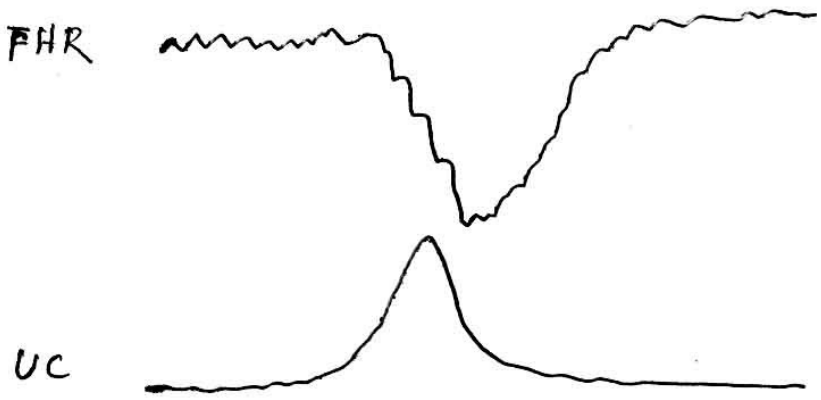
5) Late recovery has the same pathological significance as of late deceleration.

6) Biphasic deceleration – same as late deceleration.

LATE DECELERATION

Late deceleration is a symmetrical decrease in FHR beginning at or after the peak of the contraction and returning to baseline only after the contraction has ended. They are uniform in shape and begin 30 sec or more after the contraction.

Nadir of contraction is after the contraction acme



These rate decelerations are due to uteroplacental insufficiency. The time interval (or) lag period from the onset of a contraction to the onset of a deceleration was directly related to basal fetal oxygenation. Length of the lag phase was predictive of fetal PO2. Shape and the amplitude of deceleration is correlated with fetal oxygen tension.

MECHANISM OF LATE DECELERATION

1. Chemo receptor mediated vagal reflex
2. Direct hypoxic myocardial depression.

CLINICAL SITUATIONS ASSOCIATED WITH LATE DECELERATION

1. Maternal hypotension
2. Uterine hyperactivity due to oxytocin
3. Placental dysfuction

4. Epidural analgesia

5. Maternal diseases like hypertension, diabetes, collagen vascular disease.

6. Chronic maternal anaemia

7. Abruptio placenta

LABOUR ADMISSION TEST “LAT”

What is a LAT?

It is 20min recording of FHR and uterine contraction using a CTG machine in a mother who is admitted with labour pains.

WHY THERE IS A NEED FOR AN “AT”?

Intrapartum monitoring of fetal well being by intermittent auscultation needs one-to-one care. It is impossible in hospitals catering large number of patients on a day. Electronic fetal monitoring will be a boon in this situation.

It would be ideal to have a test, that can tell us the status of the fetus at the labour onset and can also predict its well being for the next few hours. An admission CTG can be such one.

The test can identify fetuses who are already compromised at the time of admission and can also predict its well being for the next 4-5 hour unless a mishappen like cord prolapse, abruption takes place.

It is can alarm us if there is a fetal distress even in low risk cases where it may be missed.

It can also ensure us if the fetus is healthy in high risk cases, so that normal labour can be allowed and unnecessary interventions can be avoided .

DRAWBACKS OF THE “AT”

Mass and Colleagues (2001) randomly Assigned 3752 low-risk women in spontaneous labor at the time of admission to either auscultation of the fetal heart using Doppler during and immediately after at least one contraction or 20 minutes of electronic fetal monitoring. Use of admission electronic fetal monitoring did not improve infant outcome. Moreover, its use resulted in increased interventions, including operative delivery. Impey and colleagues (2003) performed a similar study in 8588 low-risk women and also found no improvement in infant outcome. More than half of the women enrolled in these studies, whether they received admission electronic monitoring or auscultation, eventually required continuous monitoring for diagnosed abnormalities in fetal heart rate.

CATEGORISATION OF FHR FEATURES & TRACES
(From ACOG 1994, 1998/NICE 2001)

Feature	**Baseline heart rate (bpm)**	**Baseline Variability**	**Decelerations**	
Reassuring	110-160	> 5	None	
Non-reassuring	110-109 161-180	< 5 to >40	Early deceleration, variable deceleration, single prolonged deceleration upto 3 min	
Abnormal	< 100 > 180 Sinusoidal Pattern > 10 min	<5 to >40	Atypical variable declaration, late deceleration, single prolonged deceleration > 3 min	

Results are categorised according to (ACOG 1998/NICE/2001) guidelines.

SIGNIFICANCE OF VARIOUS TRACINGS

Reassuring	:	Implies that the trace assures fetal health
Non reassuring	:	Indicate that continuous observation or additional sample tests are required to ensure fetal health.
Abnormal	:	Warn our action in the form of additional test (or) delivery depending on the clinical picture.

Hence, an admission test is helpful when planning the subsequent management of labour. High risk women (or) women with suspicious (or) abnormal admission test should have continuous electronic fetal heart rate monitoring throughout labour.

A normal test in like an insurance policy that permit us to encourage mobilisation with no further need to perform EFM for the next 3-4 hours.

MATERIALS AND METHODS OF STUDY

A) Type of study:

Cross sectional study.

B) Cases:

400 antenatal women admitted in labour ward were selected randomly who belonged to both low and high risk group.

Inclusion Criteria

Low risk cases:

1. Pregnant women with singleton term fetus
2. In cephalic presentation
3. With labour pains either spontaneous or accelerated

High risk cases:

1. Post dated pregnancy
2. Hypertensive disorders of pregnancy
3. Gestational diabetes
4. IUGR/ oligohydraminos
5. Anaemia
6. Rh Incompatibility
7. Post caesarean pregnancy
8. Heart Disease complicating pregnancy

Exclusion Criteria

1. Preterm Labour
2. Malpresentations
3. Multiple pregnancy
4. Major anomalies of the fetus
5. Antepartum haemorrhage etc

C) Machine: "Fetal care" fetal monitoring system (CTG machine)

D) Place : Government Raja Sri Ramaswamy Mudhaliar lying in Hospital.

E) Method of study:

In this study admission test was done for 400 patients at the time of admission to labour ward. Patients were selected randomly at the time of admission to labour ward, who belonged to both low and high risk group. Patients were followed according to the 'AT' results.

Patients with normal tracings were followed up by intermittent auscultation and electronic monitoring was done once in 4-5 Hours, during monitoring whenever we suspected fetal distress, emergency intervention was made according to the stage of labour.

In patients with non- reassuring and abnormal tracing immediate ARM was done and colour of the liquor was assessed. In thin meconium stained cases amnioinfusion was given and the labour was allowed to progress. They were followed up carefully by intermittent auscultation and CTG monitoring for five minutes once in an hour when there is change of colour of liquor or when abnormal pattern appeared in CTG, according to the stage of labour, the labour was terminated by either forceps (or) cesarean section. The finding of the admission test was correlated with the outcome of the pregnancy.

To evaluate the outcome of pregnancy, fetal distress was considered to be present when abnormal FHR changes led to cesarean section or forceps delivery for

the indication of fetal distress or if the new born has an APGAR score <7 at 5 minutes following spontaneous delivery.

RESULTS AND ANALYSIS

This study was conducted in Government RSRM Hospital, Chennai. 400 pregnant women were selected randomly at the time of admission to labour ward with true labour pains and the LAT was performed on them using machine. Neonatal outcome was correlated with the test findings.

Of them, 255 were low risk cases and 145 were high risk cases.

High risk cases include, anaemia, Pre-eclampsia, Oligohydramnios, GDM, post dated pregnancy, heart disease complicating pregnancy, Rh incompatible pregnancy etc.

TABLE - 1

S. No	**Cases**	**Total Number**	**%**
1.	Low risk cases	255	63%
2.	High risk cases	145	36%
	a) Preeclampsia	29	20%
	b) Postdated Pregnancy	27	19%
	c) Anaemia	3	2%
	d) RH incompatibility	3	2%
	e) Heart disease complicating pregnancy	15	10%
	f) Post caesarean pregnancy	5	3%
	g) oligohydramnios	5	3%
	h) Others (Multiple combination of risk factors)	49	34%
	Total	**400**	**100%**

This table shows various types of test cases for whom admission test was performed. Among them 63% were low risk cases and 36% high risk cases.

TABLE 2
AGE WISE DISTRIBUTION OF THE CASES

Age Group	Number of Cases	Percentage
< 20	112	28%
20-25	248	62%
26-30	35	9%
> 30	5	1%

Majority of the patients were between 20-25 years. Teenage pregnant woman here about 28% Elderly mother were about 1% and the remaining between 26-30 years.

TABLE 3
PARITY INDEX OF THE CASES

Gravidity	**Total Number**	**Percentage**
Primigravida	229	57%
Second Gravida	114	29%
Third Gravida	41	10%
Fourth Gravida	16	4%

Majority of the patients were Primigravida (57%) the second gravida were about 29%, the remaining were third and fourth gravidae.

TABLE 4
CTG TRACING PATTERN

CTG Pattern	Number	Percentage
Reassuring	280	70%
Non reassuring	68	17%
Abnormal	52	13%

Among the four hundred cases, 280 cases had reassuring pattern (70%), 68 cases had non reassuring pattern (17%), and 52 cases had abnormal tracing pattern.

TABLE 5
DISTRIBUTION OF CTG PATTERN IN LOW AND HIGH RISK GROUP

CTG Pattern	Reassuring	Non reassuring	Abnormal
Low risk cases (255)	180 (71%)	41 (16%)	34 (13%)
High risk cases(145)	104 (72%)	24 (16%)	17 (12%)

Among the 255 low risk cases, 180 (71%) had reassuring tracing, 41 (16%) had non -reassuring tracing, 34 (13%) had abnormal tracing. Of the 145 high risk cases, 104 (72%) had reassuring pattern of tracing, 24 (16%) had non-reassuring pattern, 17(12%) had abnormal tracing.

TABLE 6
MODE OF DELIVERY

Mode of Delivery	**Number**	**Percentage**
Labour Natural	280	70%
LSCS	114	29%
Forceps Delivery	6	1%

Of the 400 cases, 280 had labour natural, 114 (29%) went for Cesarean Section and 6 cases (1%) went for Forceps Delivery.

TABLE 7
MODE OF DELIVERY IN LOW & HIGH RISK GROUPS

Mode of Delivery	**LN**	**LSCS**	**Forceps**
Low risk cases (n=255)	217 (85%)	35 (14%)	3 (1%)
High risk cases (n=145)	61 (42%)	81 (56%)	3 (2%)

Among the 255 low risk cases 85% went for labour natural and 14% went for LSCS. Among the high risk group, 56% went for LSCS and 42% went for LN. Hence, major proportion of low risk cases went for labour natural and major proportion of high risk cases went for cesarean section.

TABLE 8
MODE OF DELIVERY VS CTG TRACING PATTERN

CTG TRACING	Mode of delivery		
	LN	**LSCS**	**Forceps**
Reassuring (n=280)	219 (78%)	59 (21%)	2 (1%)
Non reassuring (n=68)	36 (53%)	29 (43%)	3 (4%)
Abnormal (n=52)	25 (48%)	26 (50%)	1 (2%)

Among 280 cases who had reassuring tracing, 78% went for labour natural, 21% (59 cases) went to LSCS and 2 cases went for forceps delivery. Among the 68 patients who had non-reassuring, 36 delivered normally and 29 patients underwent LSCS and 3 cases went for forceps delivery. Among the 52 patients who had abnormal tracing, 50% went to LSCS, 48% (25 cases) delivered normally.

That is, majority of patients with reassuring tracing delivered normally, and majority of patients with abnormal tracing under went LSCS (indications were & both for fetal distress and non-fetal distress).

TABLE 9
MODE OF DELIVERY VS CTG PATTERN IN LOW RISK CASES

CTG TRACING	Mode of delivery		
	LN	LSCS	Forceps
Reassuring (n=180)	165(91.8%)	14(7.7%)	1(0.5%)
Non reassuring (n=41)	28(68%)	11(27%)	2(5%)
Abnormal (n=34)	23(67%)	10(30%)	1(3%)

Among 180 patients who had reassuring tracing, 165 delivered normally and 14 went for LSCS.

Among 41 patients who had non-reassuring tracing, 28 delivered normally and 11 underwent LSCS, 2 underwent forceps delivery. Among 34 abnormal cases, 23 cases delivered normally, 10 cases went for LSCS and 1 case went for forceps delivery.

TABLE 10
MODE OF DELIVERY VS CTG PATTERN IN HIGH RISK CASES

CTG TRACING	Mode of delivery		
	LN	**LSCS**	**Forceps**
Reassuring (n=104)	57	46	1
Non reassuring (n=24)	4	19	1
Abnormal (n=17)	0	16	1

Among 104 patients who had reassuring trace, 57 delivered normally, 46 went for LSCS and 1 went for forceps delivery. Among 24 patients who had non-reassuring trace, 4 delivered normally 19 went for LCSC and 1 delivered after forceps application. Among 17 patients who had abnormal tracing none delivered normally, 16 went for LSCS and 1 delivered by forceps.

TABLE 11
CORRELATION BETWEEN THE RESULTS OF AT AND THE INCIDENCE OF FETAL DISTRESS IN LOW RISK GROUP

CTG TRACING	No. of cases	Fetal Distress
Reassuring	180	3 (1%)
Non reassuring	41	13 (31%)
Abnormal	34	12 (35%)

Among the patients who had reassuring tracing by 3(1%) had fetal distress. Among the patients who had non-reassuring tracing 31% had fetal distress. Among the patients who had abnormal tracing, 35% had fetal distress. Hence there is correlation between the results of AT and the occurrence of fetal distress.

TABLE 12
CORRELATION BETWEEN THE RESULTS OF AT AND FETAL DISTRESS IN HIGH RISK GROUP

CTG TRACING	No. of cases	Fetal Distress
Reassuring	104	6 (5%)
Non reassuring	24	12 (50%)
Abnormal	17	9 (53%)

Among 104 patients who had reassuring trace, only 5% had fetal distress, among 24 patients who had non reassuring tracing, 50% had fetal distress. Among 17 patients who had abnormal tracing 53% had fetal distress.

TABLE 13
CORRELATION BETWEEN CTG PATTERN AND NICU ADMISSION

CTG TRACING	No. of cases	Admitted in NICU
Reassuring	280	15 (5%)
Non reassuring	68	24 (35%)
Abnormal	52	29 (56%)

Among 280 patients who had reassuring CTG, 15 babies were admitted in NICU. 35% of the babies of non assuring group were admitted in NICU 56% of the babies of the abnormal CTG group were admitted in NICU.

So, NICU admission is more in the non reassuring and abnormal CTG group.

Chi Square Value is 98.42%.

P Value < 0.000001

Hence, there is correlation between abnormal CTG & NICU admission.

TABLE 14
CORRELATION BETWEEN CTG TRACING AND NEONATAL OUTCOME (APGAR SCORE)

CTG TRACING	Neonatal Outcome		
	No. asphyxia (Apgar 7-10)	Moderate asphyxia (6-4)	Severe asphyxia (< 4)
Reassuring (n=280)	186	93	1
Non reassuring (n=68)	24	36	8
Abnormal (n=52)	21	25	6

Chi Square value 47.91%
P Value 0.00001%

Hence, there is significant association between Admission test result and neonatal outcome.

Among 28 patients who had reassuring trace 186 had good APGAR score, 93 babies had moderate asphyxia, I have severe asphyxia.

Among 68 patients who had non-reassuring trace, 24 babies had good APGAR, 36 babies had moderate asphyxia, 8 had severe asphyxia. Among 52

patients who had abnormal trace, 21 babies had good APGAR, 25 babies had moderate asphyxia, 6 babies had severe asphyxia.

Statistical analysis of the data shows significant association between the AT and the neonatal outcome.

TABLE 15
ANALYSIS OF ADMISSION TEST AS A SCREENING TEST

Screening Test	**Fetal Distress**	**No Fetal Distress**	**Total**
Postive (Abnormal CTG) Pattern	(True +ve) 46 (a)	(False +ve) 74 (b)	(a+b) 120
Negative (Normal CTG Pattern)	(False -ve) 9 (c)	(True -ve) 271 (d)	(c+d) 280
Total	55 (a+c)	345 (b+d)	

Sensitivity = 83.54%
Specificity = 78.55%
PPV = 38.33%
NPV = 96.79%
Diagnostic Accuracy of Test = 79.25%

To evaluate the outcome, fetal distress was considered to be present when abnormal FHR tracing led to cesarean section or forceps delivery or if the newborn had an Apgar Score < 7 at 5 minutes after delivery. Here positive test result means non-reassuring and abnormal pattern of CTG and negative test result means reassuring CTG pattern.

a) True Positive : Those individuals found positive on the test developed fetal distress during the course of labour (abnormal CTG pattern with fetal distress) a=46.
b) False positive : denotes who have the positive test result but who did not develop fetal distress (abnormal CTG with good outcome) b=74.
c) False negative : denotes those with negative (normal CTG) result but later developed fetal distress.

d) True negative : denotes those with negative results (normal CTG) who did not develop fetal distress d = 271.

e) Sensitivity - Ability of the test to identify correctly all those who developed fetal distress.

$$\frac{a}{a+c} x 100 = \frac{46}{120} x 100 = 83.54\%$$

f) Specificity : ability of the test to identify correctly those who did not have the disease.

$$\frac{a}{b+d} x 100 = \frac{271}{345} x 100 = 78.55\%$$

g) Positive predictive value = this reflects the diagnostic power of the test. Predictive value of the positive test indicates the probability of getting fetal distress with a positive test result.

$$\frac{a}{a+b} x 100 = \frac{46}{120} x 100 = 38.33\%$$

h) Negative predictive value :

is probability of good outcome that is no fetal distress in negative results (normal CTG)

$$\frac{d}{c+d} x 100 = \frac{271}{280} x 100 = 96.79\%$$

Hence, Sensitivity : 83.54%

Specificity : 78.55%

Negative predictive Value : 96.79%

Positive Predictive Value : 38.33%

Diagnostic accuracy of the test : 79.25%

DISCUSSION

- This study was conducted in Government RSRM Hospital to evaluate the role of admission test as a screening test in predicting fetal distress.

- 400 women who were admitted in labour ward were randomly selected for admission test. Among those 400 patients, 255 were belonging to low risk group (63%) and 145 were (36%) were belonging to high risk group. They were cases of hypertensive disorders of pregnancy, postdatism, Anaemia, GDM, Rh incompatibility, heart disease complicating pregnancy etc.

- Among these 400 patients 112 were below the age of 20 years, 248 were between 20-25 years, 35 were between 26-30 years and 5 were more than 30 year age group.

- Among 400 patients, 229 (57%) were primigravida, 114(29%) were second gravida, 41(10%) were third gravida and 16(4%) were fourth gravida and above.

- Admission test results were normal (Reassuring) in 280 (70%) patients, non reassuring (suspicious) in 68 (17%) patients and abnormal in 52 (13%) patients.

- In 255 low risk patients, 180 (71%) had reassuring tracing, 41 (16%) had non-reassuring tracing and 34(13%) had abnormal tracing.

- Among 145 high risk patients, 104(72%) had reassuring pattern, 24 (16%) had non- reassuring pattern and 17 (12%) had abnormal pattern.

- Mode of Delivery : Among 400 patients, 280 (70%) delivered normally, 114 (29%) delivered by Cesarean section and 6 (1%) cases delivered by forceps

application. (out 114 cesarean Sections 54 were done for fetal distress as indication and the rest for other indications and out of 6 forceps cases, 3 were for fetal distress as indication and 3 were for other indications).

- When we see the mode of delivery according to CTG pattern, out of 280 normal tracing cases 219(78%) delivered normally, 2 delivered by forceps application (both were due to non-fetal distress indication)n 59 delivered by Cesarean Section (9 were for fetal distress indication and the rest were for non-fetal distress indication)

- Out of 68 patients who had non-reassuring tracing, 36 delivered normally, 3 delivered by forceps application (2 for fetal distress as indication and 1 for non-fetal distress indication) and 29 (7%) delivered by LSCS (Among them 22 were done for fetal distress indication)

- Among 52 patients who had abnormal tracing, 25 delivered normally, 1 delivered by forceps application for fetal distress and 26(50%) delivered by LSCS (among them 23 were done for fetal distress as indication and 3 were for other reasons).

- On comparing the mode of delivery in low risk and high risk population, labour natural (85%) was more in low risk group and LSCS was more on high risk group (56%)

- On seeing the mode of delivery in reassuring type of CTG pattern in low risk group. Of 180 reassuring tracing (normal), 92% delivered normally and only 8% needed emergency intervention.

- On seeing the mode of delivery in abnormal type of CTG in high risk group, out of 17, 16 cases went for emergency intervention and only 1 delivered normally. Out of 24 patients in non-reassuring group 20 cases needed

emergency intervention.

- On seeing the neonatal APGAR score, out of 280 reassuring (normal) tracing 186 (66%) had no asphyxia, and (33%) had moderate asphyxia at 5 min (but become normal at 10 minutes) and only 1 care (0.3%) had severe asphyxia (Here baby delivered 8 hours after the AT was done).

- Hence, there is good correlation between CTG findings and fetal outcome. Admission test correctly predicted the well being of the fetus. But out of 68 suspicious cases, 24 had no asphyxia and out of 52 abnormal cases 21 had no asphyxia. This can be explained by the fact that those babies were delivered soon by an emerging intervention.

- In this study for evaluation of the outcome of admission test, fetal distress was considered to be present when ominous (abnormal) FHR changes led to forceps delivery (or) Cesarean section for the indication of fetal distress (or) when the APGAR is <7 at 5 minutes, when delivered spontaneously.

- So, in normal (reassuring) tracing cases (n=280), 9 (3%) developed fetal distress, almost 97% had no fetal distress.

- In non-reassuring (suspicious) tracing cases (n=68) 25 (36%) developed fetal distress.

- In abnormal tracing (n=52), 50% developed fetal distress.

- On comparing the development of fetal distress in low risk group and high risk group,

  In high risk cases, 5% of reassuring tracing developed fetal distress, 50% of non - reassuring and 53% of abnormal tracing developed fetal distress. In Low risk group, only 1% of reassuring group developed fetal distress 31% of non-

reassuring 35% of abnormal tracing developed fetal distress. So, the occurrence of fetal distress is more in non-reassuring and abnormal group and is almost negligible in reassuring group. In both how and high risk groups, the incidence of fetal distress were certainly more on the non-reassuring and abnormal CTG group.

- When we see the NICU admission for asphyxiated babies, in 280 reassuring tracing, 5% of babies needed NICU admission, among 68 non-reassuring group 35% needed admission and of 52 abnormal tracing babies 56% needed admission for asphyxia.

- Finally analysing the predictive value of admission test (AT) in predicting fetal distress sensitivity = 83.54% specificity = 78.55%

Positive predictive value = 38.33 %
Negative predictive value = 96.79 %
Diagnostic accuracy of test = 79.25%

A comparison with previous studies

	Ingemrasson et al 91986)	**Low et al (1999)** **Sheha etal (1999)** **Didly(1999)**	**Kamalbakshee et al (1999)**	**This study**
Sensitivity	99%	-	87.5%	83%
Specificity	23%	-	21.43%	78.5%
Positive Predictive value	40%	50%	40%	38%
Negative predictive value	98%	95%	74%	96%

In this study, statistical analysis shows high sensitivity (83%) and high predictive value for normal test. That is, admission test correctly diagnosed the well being of the fetus. But the predictive value of a positive(abnormal) test to predict fetal distress is low which is evidenced by low positive predictive value. To improve the specificity and positive predictive value, false positive and false negative results are to be reduced. This can be achieved by doing additional tests like fetal scalp blood sampling (FBS) to diagnose the fetal distress exactly. But the above can not be applied in all settings due to difficulty in technique and lack of facilities.

- An ideal screening test should have high sensitivity and negative predictive value as this test is found to have the above features in my study, it is certainly recommended as a screening test for fetal distress at the time of admission.

Other Evidences to support the recommendation

1. Arulkumaran and Ingemarsson, 1989

"In situations with inadequate manpower and where auscultation cant be performed every 15 min for a period of one minute, it may be useful. If the AT is normal, Oxytocin and epidural analgesia have not been used, the risk of fetal hypoxia occuring in the next few hours is low. When it occurs, such hypoxia is likely to be from acute events.

2. The Fourth UK confidential enquiries into still births and Deaths in infancy (CEDSI) in which over 50% of intrapartum deaths of normally formed fetuses weighing >1.5 kg were due to failure to recognise or take appropriate action on CTG abnormalities (CEDSI Fouth Annual Report) - Arulkumaran, Management of Labour p.70)

3. Admission test : a predictive test in high risk labour. (Dept of O&G, Sasson Gen Hospital, Pune)concludes that reactive test appears to be predictive of fetal well being in high risk labour also, repeat tracing 4-5 hours later may improve the predictive values. Equivocal and ominous patterns require vigilant monitoring (PMID 9998354)

4. Effectiveness of AT (Shakira Parveen, Haleema Hashmi JDW Uni Health Sci Jan 2007; 1(1) 20-5 concludes. `The test was useful to detect fetal distress already present at admission and had the ability to propose fetal well being for the next few hours of labour. It is simple, convenient, non invasive and economical for screening purpose.'

5. Low et al 1999, Berkas et al, 1999. Interpretation of FHR patterns by computer and more judicious use of biochemical parameters eg. pH and lactate estimation will reduce intervention resulting from variable interpretation. In this way.

EFM should be seen as an admission screening test for intrapartum hypoxia and other parameters used as diagnostic tests.

6. Philipp J obstet Gynecol. 1999 Oct Dec; 23 (4) : 143-9 Admission test as predictor of intrauterine hypoxia.

This study determines the accuracy of the admission test in predicting intrauterine fetal hypoxia. A total of 229 subjects were included, a short continuous electronic fetal monitoring recording, was made immediately on admission, on all patients on labour and was categorized as reassuring, equivocal or ominous. Reasuring tracing is associated with low risk (6.5%) for asphyxia as measured by APGAR and umbilical cord PH, while "ominous" tracing is associated with high risk (50%) for asphyxia. In detecting an umbilical cord PH of 7.2, fetal heart rate variability is most specific (8%), while absence of acceleration is the most sensitive (50%) .

7. A randomised controlled trial of admission EFM in normal labour. Cheyne H, Dunlop A, Shields N, Mathers AM AIM : To test the hypothesis that the use of admission EFM for healthy pregnant women in spontaneous labour would result in an increase in interventions.

Conclusion : The use of admission EFM did not in itself lead to a cascade of intervention. Other factors including setting of case and philosophy of caregivers may have an effect on the rate of intervention in labour.

8. Intrapartun fetal assessment : any role for a fetal admission test?

A study by Elimian A, Lawlor P, Figereroa R etal, Dept. of O&G, State University of New York, Stony Brook. Conclude the fetal admission test is useful in predicting the absence of intrapartum fetal distress irrespective of the criterion used for evaluation. Redefined reactivity appears to be most predictive of intrapartum fetal

distress.

9. J Indian MEd Assoc. 2002-Apr ;100 (4) : 234-6 Labour Admission test - an effective risk screening tool. Kushtagi P, Naragoni.S

Recording of FH tracing on CTG for 30 min was done in 500 women on admission in labour and contraction mediated responses were recorded. LAT was found to have high specificity (93%) and negative predictive value (91%). Reactive AT tracing is of some predictive value, at least for the first few hours after admission in labour.

CONCLUSION

Admission test can defect fetal distress already present at the time of admission and it can predict fetal wellbeing for the next few hours of labour. Hence both undue delay in intervention and unnecessary intervention can be avoided. AT provides an early, easy and quick assessment of fetal well being.It is a good screening test to detect fetal distress. So we recommend it to be implemented in all mothers at the time of admission to labour ward.

BIBLIOGRAPHY

1. Arulkumaran and Ingemarsson, 1989 - The Management of Labour, by Arulkumaran.

2. The Fourth of confidential enquiries into stillbirths and death in infancy - Arulkumaran - Management of Labour p -20.

3. A study by Dept. of O&G, Sasson general hospital, Pune.

4. A study on the effectiveness of AT by Shakira Parveen, Haleema Hashmi Jow Uni Health Sri Jan 2007, 1(1), 20-5.

5. Low et al 1999, Berkcs et al, 1999 - Management of labour Arulkumaran.

6. Phillip J Obset, gynecol 1999 Oct Dec, 23(4) : 143.9 Admission test as a predictor of intrauterine hypoxia.

7. Midwifery, 2003 Sep ; 19(3) : 2221-9. Related articles cheyne H, Dunlop A, shields N, Mathers AM.

8. J Matern Fetal Neonatal Med. 2003 Jan; 13(6), 408-13 Related articles. Elimiah A, Lowlor P. Figuroa R, Wie neek V, Garry D, Quirk JG.

9. Low et al (1999), Sueha et al (1999), Didly (1999) - Arulkumaran Management of Labour.

10. Ingemarsson et al (1986).

11. Anilkumaran. S. Ingemarsson 1990, Appropriate technology in intrapartum fetal survellience. In progress in O&G (J.W.W.Shedd et al). Edinbergh, churchill livingstone p 127-140.

12. Beard R.W. Flighil G.M. Knight C.A. Roberte G.M. 1971. The significante of changes in the continuous FHR in the first stage of labour, J obstet and gyneeol Br.C.With 9 11th 78 865-881.

13. Acta Obstet Gynecol Scand 2005 No.84(11) : 1087-92 Inter observer agreements in assessing 549 labour admission tests after a starandarized training programme.

14. Crawford D Chapman M. and Allanc (1985) The Assessment of persistant bradycardia in prenatal life BSOG 92, 91-94.

15. Am. J.Obstet. Gynecol 2000 Mar; 182(3) :603-6 Am.S.Obstet. Gynecol. 2000

Dec.183(6) .1588-9 The Fetal electrocardiogram. Relationship with acidemia at delivery.

16. Int J Nurs stud 2007 Aug, 44 (6) ; 1029 -35. Epub 2006 Aug 17. Admission CTG versus intermiltent ausultation of fectal heart rate, effects on neonatal Apgar score, on the rate of cesarean sections and on the rate of instrumental delivery - a systemic review.

17. BJOG 2005 Dec : 112(12) : 1595-604. Related Articles. Prognostic value of the labour admission test and its effectiveness compared with auscultation only; a systematic review.

18. Zhonghua Fu chan Ke Za Zhi. 1993 Apr;28(4), 217-9, 253 related articles. (Cardiotocography admission monitoring and intermittent intrapartum monitoring for fetal distress in labour).

19. I Perinat Med. 1996 ; 24(3) : 199-206. Search P for the most predictive tests for fetal well being in early labour.

20. Lancet, 2003 - Feb 8; 361 (9356) : 465-70 Admission CTG : A Rct

21. Nice 2001 guidelines.

22. Edigon PT, SIBANOAJ Beard RW. British Medical J 3; 341; 1975.

23. FIGO 1987, Guidelines for the use of fetal monitoring Int. J.Gynecology & obst. 159-167.

24. Fleisher A.Seheelman.H, Jagani N et al (1982), The development of fetal acidosis in the presence of abnormal fetal heart rate tracing AM. J.Obstof gynecol 144.55-60.

25. Arulkumaran S.Ingemasson I et al, 1986 Admission test, a screening test for a fetal distres sin Labour , obst & gynec 68, 800-806.

26. BJOG 04 2005 prognostic value of LAT.
27. A meta analysis of the results of RCTs found in cochrane library (found in Pub Medcine 1996 - Mar 2005)
28. Mires G. Williams F, Howie P, RCT of CTG versus Doppler auscultation Vs FH at admission in Labour BMJ 2001.

PROFORMA

Name : Age : I.P.No : DOA :

Type of case booked : ☐ Unbooked : ☐

Educational status : Socioeconomic class :

Habitation : Urban ☐ Rural : ☐

History of present illness :

Past history :

Menstrual history :

Married since :

Obstetric Index :

High risk factors :

Clinical Examination :

1. Height : Weight
2. Findings at the time of admission :
   - i. O/E :
   - ii. P/A :
   - iii. F/H :
   - iv. P/V :

Admission Test : Reassuring ☐ Non-Reassuring ☐

☐

Abnormal ☐ ☐

☐ ☐

Type of Labour : Spontaneous Induced

Date and Time of Delivery :

Admission Delivery Interval :

Mode of Delivery :

Complications during labour : Fetal Maternal

OUT COME OF PREGNANCY

Live Birth Intrapartum Death

Sex of the baby : M ☐ F ☐

Apgar 1 min ☐ 5 mins ☐

Congenital Malformation : Yes ☐ No ☐

Neonatal Death : Yes ☐ No ☐

Cause of death :

Date :